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By Michelle Chan
Michelle Chan

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

J. WALLACE PARCE et al.

Application No.: To be Assigned

Filed: Herewith

For: HIGH THROUGHPUT SCREENING ASSAY SYSTEMS IN MICROSCALE FLUIDIC DEVICES

Examiner: To be Assigned

Art Unit:

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination of the above-identified application, please enter the following amendments and consider the following remarks. Please note that this preliminary amendment copies claims 1-34 from U.S. Patent No. 6,136,272 ('272 patent) issued October 24, 2000 to Weigl et al. The following documents are submitted herewith:

1. a courtesy copy of U.S. Patent No. 6,136,272 for the Examiner's convenience;
2. a continuation application with declaration;
3. an IDS with 1449 forms citing references form parent applications USSN 09/346,660 filed July 1, 1999 and USSN 08/671,987 (now U.S. Patent 5,942,443) filed June 28, 1996; and

4. Table 1 providing support for copied claims.

IN THE SPECIFICATION:

Please insert the following priority information beginning on page 1, line 7:

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. Patent Application No. 09/346,660, filed July 1, 1999, which is a continuation of U.S. Patent Application No. 08/671,987, filed June 28, 1996 (now U.S. Pat. 5,942,443). This application also claims the benefit of U.S. Patent Application No. 09/664,847, filed September 19, 2000, which is a continuation of U.S. Patent Application No. 09/179,242, filed October 26, 1998 (now U.S. Pat. 6,156,181), which is a continuation of U.S. Patent Application No. 08/843,212, filed April 14, 1997 (now U.S. Pat. 5,885,470), which claims the benefit of U.S. Provisional Patent Application No. 60/015,498.

IN THE CLAIMS:

Please add the following new claims:

75. A device for joining a second laminar fluid layer to, or removing a second laminar fluid layer from, a first laminar fluid layer, said device comprising:

a first plate having a first surface and a second surface, said first plate having formed therein;

a main flow channel formed in said first surface, said main flow channel having an upstream end, a downstream end, a top and a bottom;

a tributary channel having a first end and a second end;

a first inlet port in fluid connection with said upstream end of said main flow channel;

a first outlet port in fluid connection with said downstream end of said main flow channel;

a first tributary port in fluid connection with said second end of said tributary channel;

a first bridge channel having a first end and a second end, said second end of said first bridge channel in fluid connection with said first end of said first tributary channel, said first end of said first bridge channel in fluid connection with said main flow channel, joining along said bottom of said main flow channel, between said upstream end and said downstream end of said main flow channel; and

a second plate sealed to said first surface of said first plate.

76. The device of claim 75 wherein said tributary channel is formed in said first surface of said first plate.

77. The device of claim 76 wherein said tributary channel lies in said second surface of said first plate.

78. The device of claim 75 wherein said bridge channel cuts through said first plate.

79. The device of claim 75 comprising a plurality of tributary channels and a plurality of bridge channels, each of said bridge channels in fluid connection with one of said tributary channels and with said bottom of said main flow channel.

80. The device of claim 75 wherein said main flow channel has a depth between about 100 micrometers and about 1 millimeter.

81. The device of claim 75 wherein said main flow channel has a depth between about 300 micrometers and about 800 micrometers.

82. The device of claim 75 wherein said main flow channel has a width between about 20 micrometers and about 200 micrometers.

83. The device of claim 75 wherein said main flow channel has a width between about 20 micrometers and about 80 micrometers.

84. The device of claim 75 wherein said main flow channel has an aspect ratio small enough to allow diffusion of particles from a second laminar fluid layer into a first laminar fluid layer at a rate which provides a detectable change in property.

85. The device of claim 75 wherein said first end of said bridge channel is in fluid connection with said bottom of said main flow channel across the entire depth.

86. The device of claim 75 wherein said first end of said bridge channel is in fluid connection with said bottom of said main flow channel along only a portion of the depth.

87. A device for introducing a second laminar fluid layer to, or removing a second laminar fluid layer from, a first laminar fluid layer, said device comprising:

a main flow channel, characterized by a width which is the distance between the channel top and channel bottom, and a depth which is the distance between the channel sides, said width being smaller than said depth, and said main flow channel having an upstream end and a downstream end;

a first inlet port in fluid connection with said upstream end of said main flow channel;

a first outlet port in fluid connection with said downstream end of said main flow channel;

a first tributary channel having a first end and a second end;

a first tributary port in fluid connection with said second end of said tributary channel; and

a first bridge channel having a first end and a second end, said second end of said first bridge channel in fluid connection with said first end of said first tributary channel, said first end of said first bridge channel in fluid connection with said bottom of said main flow channel

between said upstream end of said main flow channel and said downstream end of said main flow channel.

88. The device of claim 87 wherein said device comprises a first plate having formed therein said main flow channel and said tributary channel.

89. The device of claim 88 wherein said device further comprises a second plate sealed to said first plate.

Please cancel claims 1-74.

REMARKS

With this amendment, claims 75-89 are pending in this application. New claims 75-89 introduce no new subject matter. Support for the new claims can be found throughout the specification and claims as originally filed. Examples of specific supporting portions of the application are indicated below in Table 1

New claims 75-89 are copied from claims 1-2, 4, 7, 15-20, 29-32 and 34 of U.S. Patent No. 6,136,272 granted October 24, 2000, to Weigl et al, with the following modifications.

First, the claims and dependencies are renumbered to conform to claim numbering win the present case and to the claims which are presented.

Second, the dependency of claim 78 is modified to depend from claim 75. In the original claims, corresponding claim 7 depends from claim 6 of the patent. Applicant has not copied claim 6 from the patent, therefore, claim 78, corresponding to claim 7of the patent is modified to depend from claim 75, corresponding to claim 1 of the patent.

Table 1, below, sets forth claims from the '272 patent and the present claims along with example support for each claim limitation as found in the present application. Applicants note that the presented claims are fully supported by the specification and claims of the present case, as filed. In addition to the support below, additional support for many, if not all of the limitations can be found in other portions of the claims and specification as filed.

Therefore, no new matter is added to the specification by the new claims and Applicants respectfully request that the claims be entered.

Please note that in Table 1, bracketed language appears in the indicated claim of the '272 patent , but is omitted from the corresponding claim in the present application. Underlined language is present in the new claims present herewith, but not in the corresponding claim in the '272 patent.

Respectfully submitted,

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TABLE 1

	U.S. Patent No. 6,136,272	Present Application
Claim 1 in '272 patent. Claim 75 in present application.	A device for joining a second laminar fluid layer to, or removing a second laminar fluid layer from, a first laminar fluid layer, said device comprising:	The present invention generally provides devices comprising microscale channel networks whereby fluid components are flowed within and out of the microscale channels. For example, Figure 5, and accompanying text on page 25, line 33 through page 27, line 3 illustrates one such channel network.
	a first plate having a first surface and a second surface, said first plate having formed therein:	Page 13, lines 39 –31 describes a first plate, i.e., a substrate having a first surface and a second surface.
	a main flow channel formed in said first surface, said main flow channel having an upstream end, a downstream end, a top and a bottom;	Page 14, lines 25-35 describes microscale channels fabricated into a surface of a substrate. For example, Figure 5, element 510 is one such main flow channel having an upstream end and a down stream end.
	a tributary channel having a first end and a second end;	Fgiure 5, element 524 illustrates an example of a tributary channel having a first end and a second end.
	a first inlet port in fluid connection with said upstream end of said main flow channel;	Figure 5, element 514 illustrates a first inlet port in fluid connection with an upstream end of the main flow channel 510.
	a first outlet port in fluid connection with said downstream end of said main flow channel;	Figure 5, element 518 illustrates a first outlet port in fluid connection with an upstream end of the main flow channel 510.
	a first tributary port in fluid connection with said second end of said tributary channel;	Figure 5, element 520 is an example of a first tributary port in fluid connection with a second

		end of said tributary channel.
	a first bridge channel having a first end and a second end, said second end of said first bridge channel in fluid connection with said first end of said first tributary channel, said first end of said first bridge channel in fluid connection with said main flow channel, joining along said bottom of said main flow channel, between said upstream end and said downstream end of said main flow channel; and a second plate sealed to said first surface of said first plate.	Figure 5, element 526 illustrates a bridge channel having a first end and a second end, wherein the first end intersects the tributary channel and the second end intersects the main channel 510. Page 15, lines 19-29 provide that the surface or plate comprising the microfluidic channels is integral with another plate or cover layer.
Claim 2 in '272 patent. Claim 76 in present application.	The device of claim 1/75 wherein said tributary channel is formed in said first surface of said first plate.	Page 4, lines 31-33 describes substrate with multiple channels formed in the same surface of the substrate. See also page 14, lines 25-27 for description of channel layouts in a surface of a substrate. Figures 1 and 5 provide separate examples of channels in a surface of a substrate.
Claim 4 in '272 patent. Claim 77 in present application.	The device of claim 2/76 wherein said second plate is optically transparent.	Page 14, lines 13-19 describes optically transparent substrates that may be used as a second plate in the devices of the present invention.
Claim 7 in '272 patent. Claim 78 in present application.	The device of claim [6]1 /75 wherein said bridge channel cuts through said first plate.	Figure 5 illustrates a bridge channel 526 which cuts horizontally through the first plate or substrate to connect the main channel 510with the tributary channel 524.
Claim 15 in '272 patent. Claim 79 in present application.	The device of claim 1/75 comprising a plurality of tributary channels and a plurality of bridge channels, each of said bridge channels in fluid connection with one of said tributary channels and with said bottom of said main flow channel.	Page 27, lines 26-37 describes alternate embodiment of the device of claim 1, wherein multiple channel networks are described. Figures 3 and 4 A-F illustrates an embodiment with a plurality of bridge channels 310-324 and a plurality of tributary channel segments, shown

		collectively as channel 304 and a main channel 308 wherein each of the bridge channel is in fluid connection with one tributary channel segment and the bottom of the main flow channel 308.
Claim 16 in '272 patent. Claim 80 in present application.	The device of claim 1/75 wherein said main flow channel has a depth between about 100 micrometers and about 1 millimeter.	The present invention provides devices with microfabricated substrates. At least one cross-section dimension of the channels is between 0.1 to 500μm. See page 3, lines 33-36.
Claim 17 in '272 patent. Claim 81 in present application.	The device of claim 1/75 wherein said main flow channel has a depth between about 300 micrometers and about 800 micrometers.	The present invention provides devices with microfabricated substrates. At least one cross-section dimension of the channels is between 0.1 to 500μm. See page 3, lines 33-36.
Claim 18 in '272 patent. Claim 82 in present application.	The device of claim 1/75 wherein said main flow channel has a width between about 20 micrometers and about 200 micrometers.	Page 4, lines 33-36 describes channel cross-section dimensions in the range of 0.1 to about 500 μm.
Claim 19 in '272 patent. Claim 83 in present application.	The device of claim 1/75 wherein said main flow channel has a width between about 20 micrometers and about 80 micrometers.	Page 4, lines 33-36 describes channel cross-section dimensions in the range of 0.1 to about 500 μm.
Claim 20 in '272 patent. Claim 84 in present application.	The device of claim 1/75 wherein said main flow channel has an aspect ratio small enough to allow diffusion of particles from a second laminar fluid layer into a first laminar fluid layer at a rate which provides a detectable change in property.	The main flow channel has at least one cross-sectional dimension in the range of 0.1 to 500 μm allowing laminar flow of fluid components to interact and cause a detectable change in a property. See page 3, line 38 through page 4, line 6. Also, See page 17, line 29 through page 18, 16.
Claim 29 in '272 patent. Claim 85 in present application.	The device of claim 1/75 wherein said first end of said bridge channel is in fluid connection with said bottom of said main flow channel across the entire depth.	Top and Bottom are relative terms. Therefore, the connection of bridge channel 526 in Figure 5, with main flow channel 510 is a description of a fluid connection between the two wherein the bridge channel connects

		with the main channel across the entire depth.
Claim 30 in '272 patent. Claim 86 in present application.	The device of claim 1/75 wherein said first end of said bridge channel is in fluid connection with said bottom of said main flow channel along only a portion of the depth.	See Figure 5 for the fluid connection between a bridge channel 526 and main flow channel 510 along the depth of the main channel. Please note that the entire depth of a channel is also "a portion of the depth".
Claim 31 in '272 patent. Claim 87 in present application.	A device for introducing a second laminar fluid layer to, or removing a second laminar fluid layer from, a first laminar fluid layer, said device comprising:	The present invention generally provides devices comprising microscale channel networks whereby fluid components are flowed within and out of the microscale channels. For example, Figure 5, and accompanying text on page 25, line 33 through page 27, line 3 illustrates one such channel network.
	a main flow channel, characterized by a width which is the distance between the channel top and channel bottom, and a depth which is the distance between the channel sides, said width being smaller than said depth, and said main flow channel having an upstream end and a downstream end;	Figure 5, element 510 is one such main flow channel having an upstream end and a down stream end.
	a first inlet port in fluid connection with said upstream end of said main flow channel;	Figure 5, element 514 illustrates a first inlet port in fluid connection with an upstream end of the main flow channel 510.
	a first outlet port in fluid connection with said downstream end of said main flow channel;	Figure 5, element 518 illustrates a first outlet port in fluid connection with an upstream end of the main flow channel 510.
	a first tributary channel having a first end and a second end;	Figure 5, element 524 illustrates an example of a tributary channel having a first end and a second end.

	a first tributary port in fluid connection with said second end of said tributary channel;	Figure 5, element 520 is an example of a first tributary port in fluid connection with a second end of said tributary channel.
	a first bridge channel having a first end and a second end, said second end of said first bridge channel in fluid connection with said first end of said first tributary channel, said first end of said first bridge channel in fluid connection with said bottom of said main flow channel between said upstream end of said main flow channel and said downstream end of said main flow channel.	Figure 5, element 526 illustrates a bridge channel having a first end and a second end, wherein the first end intersects the tributary channel and the second end intersects the main channel 510.
Claim 32 in '272 patent. Claim 88 in present application.	32. The device of claim 31/87 wherein said device comprises a first plate having formed therein said main flow channel and said tributary channel.	Page 14, lines 25-35 describes microscale channels fabricated into a surface of a substrate.
Claim 34 in '272 patent. Claim 89 in present application.	34. The device of claim 32/88 wherein said device further comprises a second plate sealed to said first plate.	Page 15, lines 19-29 describes a second plate or substrate sealed to the channeled substrate, i.e., first plate.